

REMARKS

The present submission is in response to the office action mailed on July 15, 2004 and includes a request for a three-month extension in the due date for a response.

Claims 1-4, 6, 7, 10-31, and 43-57, of which claims 1, 55, 56 and 57 are independent claims, are pending in the application. In the Office Action the Examiner states that the claims are rejected under 35 USC 103 over US 6,064,140 to Zumeris in view of US 6,218,769 to Iino. Applicants respectfully traverse the rejection and submit that a prima facie case for obviousness to support the rejection has not been established.

The Examiner notes that Zumeris teaches a "drive circuit that can independently either AC voltages or pulsed DC" and especially brings to attention "col 7 line 53 and column 8 line 16, which explicitly teach changing the amplitude of the input voltages to control the output movement". In addition, the Examiner states that Iino "directly teaches improving a Zumeris type structure by providing a laminated piezo body for increased output" and that therefore "it would have been obvious to one of ordinary skill in the art to construct Zumeris of laminate piezo sheets". As a result, the Examiner concludes that Zumeris and Iino in combination render the claimed inventions of the application obvious. Applicants respectfully traverse the rejections. However, applicants submit that neither Zumeris nor Iino, or their combination, contain limitations recited in the independent claims. Therefore the combination does not provide a prima facie case of obviousness.

Claim 1 of the application claims a piezoelectric motor having at least one power supply that electrifies electrodes "to *independently* control excitation of longitudinal *and* transverse vibrations so as to selectively generate different forms of vibratory motion in the vibrator". Applicants submit that Zumeris does not teach electrifying electrodes "to *independently* control excitation of longitudinal *and* transverse vibrations so as to selectively generate different forms of vibratory motion" in a vibrator.

Providing, independently, either AC voltages or DC voltages is not, as the Examiner seems to imply, equivalent to, or suggestive of, either electrifying electrodes to independently control longitudinal and transverse vibrations" nor to do so to "selectively generate different forms of vibratory motion". Furthermore, none of the examples cited by the examiner suggests or inherently comprises independently controlling longitudinal and transverse vibrations to selectively generate different forms of vibratory motion.

For example, in column 7 line 53 and 54, varying peak voltages from 30-100 volts changes both longitudinal and transverse vibrations together and does not change one independently of the other. Not only are the changes in the vibrations coupled and

therefore *dependent*, but *a change in driving voltage merely changes the amplitude of the vibratory motion without changing its form*. Similarly, for the example given in column 8 lines 15 and 16, in which "diagonal voltages may be pulsed with voltages of the same or different amplitudes", there is no hint in the patent that as the pulsed voltages are changed, that the longitudinal and transverse vibrations are controlled independently of the other. Nor does the patent teach a method of pulsing that would result in independent control of the longitudinal and transverse vibrations.

Whereas Zumeris describes (Figs. 11A - 11C and discussions thereof) piezoelectric vibrators having a particular electrode or electrodes that can be used to control only longitudinal motion of the vibrators, Zumeris describes electrifying the electrode or electrodes *to preload* the vibrators against a body that they are used to move (column 12 lines 1-16). Zumeris does not teach in any way or manner the limitation recited in claim 1 of electrifying the particular electrodes to selectively generate different forms of vibratory motion, how the electrodes may be electrified to do so, or a power supply that does so. Furthermore, other electrodes in Zumeris's vibrators are not controlled to excite transverse vibrations independently of the longitudinal vibrations. Zumeris therefore does not teach in the examples of Figs. 11A - 11C, nor anywhere else, an additional limitation of claim 1 of controlling longitudinal *and* transverse vibrations independently of each other.

Similarly, claim 1 in Zumeris claims electrifying electrodes of a vibrator with "a first electrical excitation" to cause a force that is only in a direction perpendicular to a first edge and electrifying electrodes with a "second electrical excitation" that produces motion having a component parallel to the edge *and* a component perpendicular to the edge. Zumeris does not indicate or show in any manner how the first and second excitations may be used to selectively generate different forms of vibratory motion in the vibrator or teach a power supply that controls the excitations to do so. Additionally, even if Zumeris teaches electrification to cause *only* force perpendicular to one edge, and thereby presumably independently controlling longitudinal vibrations, the second electrification produces motion having both components perpendicular *and* parallel to the edge. The second electrification therefore controls conjointly transverse and longitudinal vibrations and cannot be construed to provide independent control of transverse vibrations. On the basis of claim 1, or other claims in Zumeris, Zumeris cannot be interpreted to teach the limitation of claim 1 of independently controlling longitudinal *and* transverse vibrations.

With regard to Iino, the Examiner states that in Iino "only phases are changed and not amplitudes of the drive signal, thus the same elliptical output would be obtained from

any input signal.” *Thus Iino also does not teach independently controlling longitudinal and transverse vibrations to selectively provide different forms of vibratory motion.*

In view of the Examiner’s arguments, applicants respectfully submit that the Examiner and the applicants agree that Iino does not teach controlling electrification of the piezo sheets to independently control longitudinal and transverse vibrations and selectively generate different forms of vibratory motion in a vibrator. However, whereas Iino does not teach independently controlling longitudinal and transverse vibrations by electrification, applicants point out, as they have in their response to the preceding office action, that Iino in fact teaches away from independently controlling longitudinal and transverse vibrations *by electrification.*

As noted before by the applicants, Iino teaches a method of independently controlling longitudinal and transverse vibrations of a multilayer piezoelectric motor *that does generate different forms of vibrations in the motor.* The method requires *changing a ratio the number of longitudinal to transverse layers* (column 11 lines 6-12, column 16 lines 15-18 and column 20 lines 58-61), *i.e. changing the physical structure of the motor* and not controlling electrification of the motor electrodes. Iino does not suggest anywhere that control of the form of motion performed by the multilayer motor can be provided by controlling electrification of the layers. Applicants contend, as before, that by omission, Iino teaches away from controlling the form of motion of a layered motor by controlling its electrification.

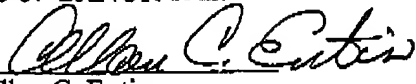
In view of the above, it must be concluded that the combination of Zumeris and Iino does not provide the invention of claim 1 and that therefore the combination does not support a prima facie obviousness rejection of the claim.

Independent claims 55, 56 and 57 are patentable at least for the same reasons that claim 1 is patentable. In addition, applicants point out that the Examiner has not addressed other limitations recited in claims 55, 56 and 57 that are not present in either Zumeris or Iino. For example neither Zumeris nor Iino describe the limitation of claim 56 of using phase to selectively generate different forms of vibratory motion. Nor do Zumeris or Iino describe using the limitation recited in claim 57 of using frequency to selectively generate different forms of vibratory motion.

In conclusion, applicants submit that Zumeris and Iino do not support a rejection of independent claims 1, or 55, 56 or 57 for prima facie obviousness. Dependent claims presently pending are patentable at least through their dependence on claim 1. Applicants

respectfully request that the Examiner carefully review applicants' arguments and reconsider his rejection of the claims presently pending.

Respectfully submitted,
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